

WHAT IS CLAIMED IS:

1. A method, comprising:
 replicating a first change made to a primary volume, wherein
 the first change is replicated to a secondary volume; and
 replicating a second change made to the primary volume, wherein
 the second change is replicated to the secondary volume,
 the second change is caused by a restore operation, and
 the replicating the second change comprises recording an order of the
 second change relative to the first change.

2. The method of claim 1, wherein
 the replicating the first change comprises performing periodic replication; and
 the replicating the second change comprises updating a volume map to
 indicate that a region of the secondary volume, which corresponds to a
 region of the primary volume changed by the restore operation, should
 be synchronized with the primary volume during a next period of said
 performing periodic replication.

3. The method of claim 1, wherein
 the replicating the first change comprises performing asynchronous
 replication,
 the replicating the second change comprises allocating an entry corresponding
 to the restore operation in a log of changes to the primary volume, and
 the entry includes information indicating the order of the second change
 relative to the order of the first change.

4. The method of claim 1, wherein
 the replicating the first change comprises
 recording in a next snapshot one or more changes between a current
 snapshot and the primary volume while one or more changes
 indicated in the current snapshot are applied to the secondary
 volume,

converting the next snappoint to the current snappoint,
 creating a new next snappoint at a subsequent point in time, and
 periodically repeating the recording, the converting, and the creating;
 and
 the replicating the second change comprises updating the next snappoint to
 indicate one or more regions of the primary volume modified by the
 restore operation.

5. The method of claim 4, wherein
 the updating the next snappoint comprises
 logically ORing a bitmap comprised in the next snappoint with a
 restore bitmap; and
 the restore bitmap indicates the one or more regions of the primary volume
 modified by the restore operation.

6. The method of claim 1, wherein
 the replicating the first change comprises
 maintaining a log of changes applied to the primary volume, wherein
 the log records an order of the changes, and
 applying each of the changes maintained in the log to the secondary
 volume in the order recorded in the log; and
 the replicating the second change comprises
 allocating an entry in the log, wherein
 the entry corresponds to the second change, and
 updating the order recorded in the log to indicate the order of the
 second change relative to other changes recorded by the log.

7. The method of claim 6, further comprising
 applying a plurality of changes to the secondary volume as a single atomic
 operation before applying any subsequently-ordered changes recorded
 by the log to the secondary volume, wherein
 the plurality of changes is caused by the restore operation, and
 the plurality of changes comprises the second change.

8. The method of claim 7, further comprising storing data to be applied to the secondary volume in a secondary log, wherein the data includes values of one or more regions of the primary volume as a result of the restore operation, and the entry corresponding to the change includes a pointer to the data in the secondary log.
9. The method of claim 7, further comprising applying to a snapshot of the secondary volume the instant-restore-initiated changes; wherein the applying plurality of changes to the secondary volume as the single atomic operation comprises performing an instant restore operation, and the instant restore operation restores the secondary volume from the snapshot.
10. The method of claim 1, wherein said replicating the second change comprises applying the second change to the secondary volume independently of performance of background activity to implement the second change on the primary volume.
11. A computer readable medium, comprising program instructions executable to:
 - replicate a first change made to a primary volume, wherein the first change is replicated to a secondary volume; and
 - replicate a second change made to the primary volume, wherein the second change is replicated to the secondary volume, the second change is caused by a restore operation, and the program instructions are executable to record an order of the second change relative to the first change.
12. The computer readable medium of claim 11, wherein the program instructions are executable to:
 - perform periodic replication, wherein

the periodic replication replicates the first change and the second change, and
replicating the second change comprises updating a volume map to indicate that a region of the secondary volume, which corresponds to a region of the primary volume changed by the restore operation, should be synchronized with the primary volume during a next period of periodic replication.

13. The computer readable medium of claim 11, wherein the program instructions are executable to:
perform asynchronous replication, wherein
the asynchronous replication replicates the first change and the second change,
replicating the second change comprises allocating an entry corresponding to the restore operation in a log of changes to the primary volume, and
the entry includes information indicating the order of the second change relative to the order of the first change.

14. A system, comprising:
a processor; and
a memory storing program instructions executable by the processor to:
replicate a first change made to a primary volume, wherein
the first change is replicated to a secondary volume; and
replicate a second change made to the primary volume, wherein
the second change is replicated to the secondary volume,
the second change is caused by a restore operation, and
the program instructions are executable to record an order of
the second change relative to the first change.

15. The system of claim 14, wherein the program instructions are executable by the processor to:
perform periodic replication, wherein

the periodic replication replicates the first change and the second change, and
replicating the second change comprises updating a volume map to indicate that a region of the secondary volume, which corresponds to a region of the primary volume changed by the restore operation, should be synchronized with the primary volume during a next period of periodic replication.

16. The system of claim 15, wherein
the updating the next snappoint comprises logically ORing a bitmap comprised in the next snappoint with a restore bitmap; and
the restore bitmap indicates the one or more regions of the primary volume modified by the restore operation.

17. The system of claim 14, wherein the program instructions are executable by the processor to:
perform asynchronous replication, wherein
the asynchronous replication replicates the first change and the second change,
replicating the second change comprises allocating an entry corresponding to the restore operation in a log of changes to the primary volume, and
the entry includes information indicating the order of the second change relative to the order of the first change.

18. The system of claim 17, wherein
the replicating the first change comprises
maintaining a log of changes applied to the primary volume, wherein
the log records an order of the changes, and
applying each of the changes maintained in the log to the secondary volume in the order recorded in the log; and
the replicating the second change comprises
allocating an entry in the log, wherein

the entry corresponds to the second change, and
 updating the order recorded in the log to indicate the order of the
 second change relative to other changes recorded by the log.

19. The system of claim 18, wherein the program instructions are
 executable by the processor to:
 store data to be applied to the secondary volume in a secondary log, wherein
 the data includes values of one or more regions of the primary volume
 as a result of the restore operation, and
 the entry corresponding to the change includes a pointer to the data in
 the secondary log.

20. The method of claim 7, wherein the program instructions are
 executable by the processor to:
 apply to a snapshot of the secondary volume the instant-restore-initiated
 changes; wherein
 applying plurality of changes to the secondary volume as the single
 atomic operation comprises performing an instant restore
 operation, and
 the instant restore operation restores the secondary volume from the
 snapshot.

21. A system, comprising:
 a primary volume;
 a secondary volume; and
 means for replicating the primary volume to the secondary volume, wherein
 the means for replicating record an order of first change to the primary
 volume relative to an order of a second change to the primary
 volume, and
 the second change is due to the primary volume being restored from a
 point-in-time copy of the primary volume.

22. The system of claim 21, wherein

the means for replicating perform periodic replication,
the periodic replication replicates the first change and the second change, and
replicating the second change comprises updating a volume map to indicate
that a region of the secondary volume, which corresponds to a region
of the primary volume changed by the restore operation, should be
synchronized with the primary volume during a next period of periodic
replication.

23. The system of claim 21, wherein
the means for replicating perform asynchronous replication,
the asynchronous replication replicates the first change and the second change,
replicating the second change comprises allocating an entry corresponding to
the restore operation in a log of changes to the primary volume, and
the entry includes information indicating the order of the second change
relative to the order of the first change.

24. A system, comprising:
a primary volume,
a secondary volume,
a primary node coupled to access the primary volume; and
a secondary node coupled to the primary node by a network and coupled to
access the secondary volume, wherein
the secondary node maintains the secondary volume as a replica of the
primary volume,
the primary node is configured to record an order of a first change to
the primary volume relative to a second change to the primary
volume,
the second change is caused by restoring the primary volume from a
point-in-time copy of the primary volume; and
the secondary node is configured to apply the first change and the
second change to the secondary volume in the order recorded
by the primary node.